

919. Psychology and Pedagogy of Reading
Spring. 3(3-0) CEP 811, T E 820A, CEP 915 or approval of instructor. Interdepartmental with the Department of Teacher Education.

Psychological foundations of reading process, and instruction in reading. Cognitive processes and implications for models of reading are emphasized.

928. Conceptual Foundations of Educational Research

Fall. 3(3-0) Approval of instructor. Interdepartmental with and administered by the Department of Teacher Education.

Epistemology and ideology in educational research. Analysis of concepts of method, causation, objectivity and subjectivity in historical perspective.

931A. Seminar in Instructional Technology: Research and Development

Fall. 3(3-0) Approval of department.

History and development of instructional technology emphasizing leaders, events, research and legislation affecting use of instructional technology in education.

931B. Seminar in Instructional Technology: Research and Development

Winter. 3(3-0) Approval of department.

Analysis and appraisal of selected research studies in instructional technology with attention to purposes, rationales, assumptions, designs, methodologies and findings.

931C. Seminar in Instructional Technology: Research and Development

Spring. 3(3-0) Approval of department.

Analysis and appraisal of student's dissertation proposals and reports on surveys of related literature.

934A. Seminar in LOGO Educational Research

Fall. 3(3-0) CEP 434 or CEP 834.

Survey of current research and educational applications of LOGO; analysis of LOGO list-processing characteristics.

935. Seminar in Principles and Practice of Instructional Consultation

Spring. 3(3-0) CEP 931A, CEP 931B, CEP 410, approval of instructor.

Theoretic framework for consultation with instructional development clients. Case studies, role play simulations, debriefings. Application of the principles and development of consultation strategies and styles.

939. Policy and Legal Issues in Testing

Spring of even-numbered years. 3(3-0) CEP 401. Interdepartmental with and administered by the Department of Teacher Education.

Public policy and legal issues concerning the use of standardized testing to make critical decisions about individuals in American public education.

940. Educational Applications of Item Response Theory

Spring of odd-numbered years. 3(3-0) CEP 800; CEP 905.

Assumptions, model selection, model fit, estimation of item/ability parameters, equating, scaling, item banking and test construction with the Rasch, two-and three-parameter logistic models. Computer experience using BICAL and LOGIST.

942. Multivariate/Data Analysis in Education

Spring of even-numbered years. 4(4-0) CEP 904, CEP 905, CEP 906.

Multivariate analysis techniques used in education and educational psychology; emphasis on techniques for analysis of designed experiments and methods for analysis of repeated measures data including application and interpretation.

948A. Counseling Theories

Fall. 3(3-0) Approval of instructor. Interdepartmental with and administered by the School of Health Education, Counseling Psychology and Human Performance.

Survey of counseling theories and research with emphasis on current issues which have implications for counseling practice or for counselor education.

948B. Psychology of Vocational Development

Winter. 3(3-0) Approval of instructor. Interdepartmental with and administered by the School of Health Education, Counseling Psychology and Human Performance.

Relationship between psychological concepts and vocational development.

949B. Learning Foundations of Counseling Psychology

Fall. 3(3-0) HCP 949A or approval of instructor. Interdepartmental with and administered by the School of Health Education, Counseling Psychology and Human Performance.

Principles of learning and their application to the counseling process.

953. Ethics in School and Counseling Psychology

Spring. 3(3-0) Doctoral students in counseling psychology or school psychology. Interdepartmental with and administered by the School of Health Education, Counseling Psychology and Human Performance.

Professional ethics, standards, principles, guidelines and issues concerning the training and professional activities of counseling psychology and school psychology. Relevant legal issues and precedents.

975A. Field Experience: Special Education Administration Simulation

Spring. 3(0-9) Approval of instructor.

Supervised graduate practicum in administration of the Special Education program of a simulated school district.

975B. Field Experience: Special Education Administration

Fall, Spring. 3 to 12 credits. May reenroll for a maximum of 18 credits. Approval of department.

Supervised graduate practicum or internship in special education administration.

976. Policy Issues in Special Education

Fall. 4(4-0) Graduate students and approval of instructor.

Policy concerns in special education including economic, social, legal, and organizational issues. Policy implications within the theoretical framework of organizational change.

982. Seminars in Counseling, Educational Psychology and Special Education (MTC)

Fall, Winter, Spring, Summer. 1 to 9 credits. May reenroll for a maximum of 15 credits if different topics are taken. Approval of department.

Seminars in the various fields of emphasis in counseling, educational psychology and special education.

983. Readings and Independent Study in Counseling and Educational Psychology

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 15 credits. Approval of department.

Study on an individual or group basis in the various fields of emphasis.

984. Laboratory and Field Experience in Counseling and Educational Psychology

Fall, Winter, Spring, Summer. 1 to 9 credits. May reenroll for a maximum of 15 credits. Approval of department.

Supervised graduate practicums, observations, internships, and externships in the various areas of emphasis.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

CRIMINAL JUSTICE C J

College of Social Science

110. Introduction to Criminal Justice

Fall, Winter, Spring, Summer. 3(3-0)

Agencies and processes of criminal justice, emphasizing historical, constitutional (legal), and political considerations. Criminal justice is also analyzed as a system, with the problems and prospects for change.

210. Introduction to Forensic Science

Spring. 3(3-0) Not open to majors in Criminalistics.

Nontechnical survey of forensic science and its relationship to the criminal justice system. Evidence and crime scene investigations. Criminalistics, including evidence, serology, pathology, toxicology, questioned documents and expert testimony.

312. Criminalistics I

Fall. 3(0-6) Criminalistics majors.

Criminalistics laboratory techniques. Photography, crime scene recording, reproduction of evidence, latent fingerprints.

313. Criminalistics II

Winter. 3(0-6) C J 312, approval of school.

Criminalistics laboratory techniques. Firearms. Hair and fiber identification. Comparative microscopy.

314. Criminalistics III

Spring. 3(0-6) C J 313, approval of school.

Criminalistics techniques. Serology. Comparative microscopy. Document examination. Forensic chemistry.

**Description — Criminal Justice
of
Courses**

- 315. Criminal Investigation**
Fall, Winter. 4(4-0) C J 375.
Theory of investigation, crime scene conduct, collection and preservation of physical evidence and methods used in scientific interpretation of evidence.
- 318. Crime and the Community**
Fall, Spring. 4(4-0) C J 320.
Interdisciplinary survey of police-criminal justice and community relations. Stresses the community role and responsibility for crime, crime-coping programs, and the need for the improvement of criminal justice processes.
- 320. Criminology**
Fall, Winter, Spring, Summer. 4(4-0) SOC 241 or C J 110 or approval of school. Interdepartmental with and administered by the Department of Sociology.
Crime analyzed from sociological perspective: meaning of "crime," crime statistics, and measurement, theories of crime causation, crime typologies, e. g., professional organized, violent, sex, white-collar crimes, juvenile delinquency.
- 330. Organizational Theory and the Politics of Criminal Justice**
Fall, Spring. 4(4-0) C J 320 or approval of school.
An historic and a comparative overview of the principles of organization used by criminal justice agencies. Current theories and research on organization, with special attention to the impact of politics on system objectives and policy development.
- 335. Police Process**
Fall, Winter, Spring, Summer. 4(4-0) C J 110, C J 320.
Functions of law enforcement and the roles of the police in modern society. Study of the police from several perspectives; historical, sociological, psychological, organizational and political.
- 355. Juvenile Justice Process**
Fall, Winter, Spring, Summer. 4(4-0) C J 320.
Variables related to the duties and responsibilities of criminal justice practitioners working with delinquents. Prevalent interdisciplinary issues, ideas, principles and assumptions pertaining to delinquency.
- 365. Corrections Process**
Fall, Winter, Spring, Summer. 4(4-0) C J 320.
An historical view of the development of methods of offender treatment. Operation of a correctional system. The effect of institutionalization upon individuals. Alternatives to incarceration.
- 375. Criminal Law Process**
Fall, Winter, Spring, Summer. 4(4-0) C J 320.
Administration of criminal justice: investigation, detection, arrest, search, seizure, charging, adjudication, sentencing, probation, corrections, parole. Constitutional safeguards and legal controls on official action emphasized.
- 400H. Honors Study**
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Seniors or approval of instructor.
Individually selected programs of supervised group or individual study dealing with some phase of the criminal justice system.
- 401. Independent Study**
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. C J 335, C J 355, C J 365, C J 375 or approval of school.
Individual study of the various fields of emphasis in criminal justice, under direct supervision of appropriate faculty member.
- 409. Issues in Criminal Justice**
Fall, Winter, Spring, Summer. 3 or 4 credits. May reenroll for a maximum of 15 credits when different topics are taken. C J 335, C J 355, C J 365, C J 375 or approval of school.
Forum for course offerings on special issues in criminal justice, by visiting instructors or regular faculty.
- 425. Women in Criminal Justice**
Winter. 3(3-0) C J 320 or SOC 320 or approval of school.
Women as offenders and victims. Women professionals in criminal justice. Literature in criminology and victimology.
- 432G. Fundamentals of Traffic Law**
Spring. 3(3-0) Interdepartmental with and administered by the Department of Teacher Education.
Nature, function and application of traffic law as it applies to the safe and efficient movement of people and goods in a broadly conceived traffic accident prevention program.
- 434. Police Administration and Management**
Fall, Winter. 4(4-0) C J 335, C J 375.
Principles of organization and management of a police agency. Line and non-line functions, personnel administration, planning, budgeting, goals and control.
- 435. Analysis of Police Operations**
Spring. 3(3-0) C J 434 or approval of school.
Analysis of police operations including patrol, criminal investigation, staff services, and traffic enforcement. Measurements of police productivity as related to goals. Principles of management evaluation of police agency organization and administration.
- 440. Introduction to Highway Traffic Administration**
Fall. 4(4-0)
Systems approach to highway traffic administration emphasizing the interrelationships among agencies having management responsibilities and their accident prevention and loss reduction countermeasures to combat system failures. Future needs and alternatives.
- 441. Police and Court Traffic Administration**
Spring. 4(4-0)
Police and court traffic functions relative to other police and court functions in the criminal justice system. Systems approach to managing traffic accident prevention programs. Weaknesses, future needs and alternatives.
- 455. Analysis of Delinquency Programs**
Fall, Winter. 4(4-0) C J 355 or approval of school.
Social organization and administration of delinquency prevention programs, juvenile courts and treatment agencies.
- 456. Juvenile Justice Case Analysis**
Spring. 3(3-0) C J 355, C J 455.
The use of actual juvenile delinquent cases to evaluate past and current practices and future needs. The selections of therapeutic techniques and strategies and their application to specific types of clients.
- 465. Analysis of Correctional Operations**
Fall, Winter. 4(4-0) C J 335, C J 355, C J 365, C J 375 or approval of school.
A critical analysis of existing institutions and community corrections programs; administrative methods of program implementation and evaluation. Prevalent correctional operational policies. Problems of effecting change.
- 466. Correctional Administration and Management**
Spring. 3(3-0) C J 365, C J 375, C J 465.
The application of principles of administration and management to corrections including a systemic examination of the impact of change on the total correctional system and change resistance from both external and internal environments.
- 472. Criminal Law**
Fall, Winter. 4(4-0) C J 335, C J 355, C J 365, C J 375 or approval of school.
Analyses and classifications of substantive common law and statutory criminal offenses; defenses and other limitations on criminal capacity.
- 473. Evidence and Proof of Crime**
Spring. 3(3-0) C J 375.
Concepts of proof and logic; basic principles and definitions of evidence law; review of criminal investigation; chain of evidence; trial process; presentation and admissibility; constitutional issues.
- 480. Alcohol: A Social Dilemma**
(C J 433.) Winter, Spring. 3(3-0) Senior majors, Criminal Justice majors or approval of school. Interdepartmental with and administered by the School of Social Work.
Substance abuse with emphasis on beverage alcohol. Sociological, economic, psychological and medical aspects of substance abuse; prevention, assessment, treatment, rehabilitation.
- 485. Security Systems**
Fall. 3(3-0) Majors or approval of school.
Capabilities and limitations of security systems, both public and private, with particular reference to crime and crime-related problems. Interrelationships between security and other criminal justice agencies.
- 486. Loss Prevention**
Spring. 4(4-0) Majors or approval of school.
Operation and management of loss prevention (asset protection). Programs in business, industry, government and institutions. Particular attention to theft control (employee dishonesty, shoplifting, etc.) and fire protection.
- 490. Criminal Justice Practicum**
Fall, Winter, Spring, Summer. 3 to 12 credits. May reenroll for a maximum of 12 credits. C J 320; majors only.
Planned program of research internship, observation, study, and work in selected criminal justice agencies. Supplements classroom study with participation in criminal justice systems of United States and foreign nations.

- 492. Methods of Criminal Justice Research**
Fall, Winter, Spring, Summer. 4(4-0)
C J 335, C J 355, C J 365, C J 375 or approval of school.
Elements of scientific perspective; analysis of published reports to illustrate theory interacting with practice. Conceptual frameworks, negotiating access to and collection of data, design choice, analytic techniques, and final reporting.
- 801. Independent Study**
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 6 credits. Majors or approval of school.
Individual research and writing in student's field of interest. Requires approval and direction by professor associated with major field of interest.
- 809. Special Issues in Criminal Justice**
Fall, Winter, Spring, Summer. 3 to 5 credits. May reenroll for a maximum of 15 credits when different topics are taken. Majors or approval of school.
Forum for study of issues not given continuous consideration in the graduate program.
- 810. Proseminar in Criminal Justice**
Fall. 3(3-0)
Recent literature in criminal justice administration and criminology; current developments and trends. Impact of research on operations in criminal justice.
- 811. Design and Analysis in Criminal Justice Research**
Fall. 4(4-0) C J 492.
Application of research methods to criminal justice problems, theory and hypothesis construction, design of survey instruments, logic of data analysis, tabular and descriptive techniques, computer usage in data analysis.
- 812. Criminal Justice Management Issues**
Winter. 3(3-0) Majors or approval of school.
Management requirements of the criminal justice process in transition. Problems and innovative concepts of criminal justice system development, decision theory, information needs, planning, personnel and budgeting.
- 813. Criminal Justice Personnel Systems Development**
Winter. 3(3-0)
Personnel administration approaches to improvement of criminal justice systems such as personnel administration by objectives, and systems analysis approach to human resource development models consonant with criminal justice systems evolution.
- 814. Fiscal Administration in Criminal Justice**
Spring. 3(3-0)
Transition from traditional budgeting to program planning and evaluation budgeting. Implications of treating budgeting as a tool in criminal justice administrative decision making. Practical experience in budget preparation and justification.
- 815. Seminar in Criminal Investigation**
Fall. 3(3-0) Majors or approval of school.
Seminar in investigative techniques; criminalistics; case studies; including discussion on quantum of proof in criminal investigations and probative value of physical evidence.
- 816. Seminar in Forensic Science**
Winter. 3(3-0) Majors or approval of school.
An investigation of the role of forensic science in the administration of justice; case studies; laboratory techniques; interpretation of proof.
- 817. Independent Study in Forensic Science**
Fall, Winter, Spring. 3(0-6) Majors or approval of school.
Directed laboratory work in forensic science.
- 818. Social Control, Criminal Justice and Community Relations**
Winter. 3(3-0) C J 318.
Authority and social control, advanced community relations and criminal justice, and socio-political aspects of criminal justice processes. Field study component required.
- 820. Crime, Criminal Behavior and Criminology**
Spring. 3(3-0) C J 320.
Classical and contemporary explanations for crime and criminal behavior related to criminal justice. Implications of differing theoretical concerns for the criminal justice system. Advanced criminology.
- 822. Historical and Comparative Criminal Justice**
Spring. 3(3-0) Majors or approval of school.
Criminal justice systems are examined on a global basis exclusive of the United States. Emphasis is placed on major different legal philosophies.
- 837. Managing Police Organizations**
Winter. 3(3-0) C J 812.
Administrative issues in directing, controlling and coordinating law enforcement agencies at supervisory levels. Applications of socio-behavioral concepts. Fundamental issues in police management.
- 838. Assessment of Police Policies and Operations**
Spring. 3(3-0) C J 837.
Critical analysis of recent police policy-related research. Operations research and policy analysis as applied to the deployment of human resources and policing strategies. Efficiency and effectiveness of operational information systems.
- 840. Highway Traffic Administration**
Winter. 3(3-0)
The Federal-state-local partnership in highway traffic administration. Laws, standards and policies regulating the accident prevention and loss reduction countermeasures of governmental agencies and private industry. Problems and needs.
- 855. Delinquency Prevention and Control**
Fall. 3(3-0)
Evaluation of primary and secondary delinquency prevention, control and treatment programs. Critical analysis of current major hypotheses, recent developments, and contributions by operational and academic sources.
- 865. Adult Corrections**
Fall. 3(3-0)
Traditional and contemporary correctional practices. Social, political, economic and organizational factors that determine correctional policies. Current trends in adult corrections.
- 866. Adult and Juvenile Correctional Program Management**
Winter. 3(3-0) C J 855 or C J 865.
Planning, organizing and operating adult and juvenile correctional programs on institutional and community levels.
- 867. Analysis and Evaluation of Prevention and Correctional Programs**
Spring. 3(3-0)
Analysis and evaluation of research relating to adult and juvenile prevention and correctional programming. Application of research design to program evaluation.
- 871. Law of Corrections**
Winter. 4(4-0) Majors or approval of school.
Constitutional limitations and impact of law on correctional practice. Due process, judicial sentencing, probation, prisoners' rights, parole grant, revocation of probation and parole.
- 872. Criminal Procedure**
Spring. 4(4-0) A law course.
Criminal procedure as applied to police and courts. Due process, Bill of Rights, right to counsel, search and seizure, confessions, bail, prosecution, guilty pleas, trial.
- 880. Planning in Criminal Justice**
Fall. 3(3-0) C J 492.
Models for planning. Empirical basis for organizational planning. Role of planning in operational administration. Assessment of current system capabilities.
- 881. Project and Program Implementation**
Winter. 3(3-0) C J 880 or approval of school.
Managerial strategies and factors involved in the effective implementation of projects and programs. Development and use of information and monitoring systems.
- 882. Evaluation Research in Criminal Justice**
Spring. 3(3-0) C J 880, C J 881.
The conduct and utilization of evaluative research in projects, programs and agencies. Strategies for conducting, interpreting and utilizing operational research.
- 885. Security Management**
Fall. 3(3-0) C J 485 or concurrently, or approval of instructor.
History of and legal bases for protective services. Organization and management of commercial and proprietary security units in business, industry, institutions and government. The systems approach to security.
- 890. Practicum**
Fall, Winter, Spring, Summer. 1(0-4) to 6(0-24) Majors or approval of school.
Planned program of research observation, study and work in selected criminal justice agencies. Designed to supplement classroom study with participation in domestic and foreign criminal justice systems.
- 892. Quantitative Methods in Criminal Justice Research.**
Winter. 4(4-0) C J 492, C J 811.
Views the relationship and application of statistical techniques to theory building and concept construction. Gives an overview of statistical methods with an emphasis on those most useful for research in criminal justice.

**Description — Criminal Justice
of
Courses**

897. Policy Change Paper
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 4 credits. Majors or approval of school.

Development of plan for significant policy change and its implementation in a criminal justice agency.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 credits. Majors or approval of school.

Planned research and writing directed by student's thesis committee.

930. Seminar on Criminal Justice Systems
Winter. 3(3-0) Graduate students.

Topical issues on the development, functioning, and interrelationships of components of criminal justice systems and how systemic coherence can be achieved within a democratic society.

990. Seminar in Criminal Justice and Criminology
Fall. 3 to 5 credits. Graduate students.

Analysis of major research contributions to criminal justice and criminology.

992. Research Utilization and Application in Criminal Justice
Spring. 3(3-0) Majors or approval of school.

Substantive and administrative problems of conducting research and existing attempts to solve these. Utilization of research in bringing about change in the criminal justice system. Methods of maximizing research utility.

**CROP AND SOIL
SCIENCES CSS**

**College of Agriculture and Natural
Resources**

101. Crop Science
Fall. 3(3-0)

Principles of identification, adaptation, management, and utilization of field crops for food and fiber. Fundamentals of crop management, breeding, weed control, crop quality, and tropical crops in world agriculture.

202. Soil and Our Environment
Spring. 3(3-0) Not open to students with credit in CSS 210. Non-majors only.

Role of soil in growing plants, water use and conservation, nutrient cycling, fertilizers, environmental quality, animal health, food-population dilemma.

204. Corn and Soybean Production
Fall. 2(2-0) CSS 101, CSS 202 or CSS 210.

Topics related to increased efficiency in corn and soybean production: time of planting; irrigation scheduling; fertility; and weed, insect and disease control.

205. Navy Bean and Sugarbeet Production
Winter. 2(2-0) CSS 101, CSS 202 or CSS 210.

Navy bean and sugarbeet production and marketing in Michigan. Presentations by specialists from within the University and the navy bean and sugarbeet industries.

206. Small Grain Production
Winter. 2(2-0) CSS 101, CSS 202 or CSS 210.

Small grain production, use, and marketing in Michigan and the world.

210. Fundamentals of Soil Science
Fall, Winter. 4(3-2) CEM 141B. Not open to students with credit in CSS 202.

Nature of soils and their relation to plant growth, water regimes, nutrient cycling, erosion, environmental quality, plant composition, animal health and world food production.

301. Forage Crops
Fall. 3(2-2) Sophomores.

Distribution, morphology, identification, physiology, management and utilization of forage crops for hay silage, and pasture for livestock and for soil improvement and conservation.

318. Turfgrass Management
(CSS 418.) Fall. 3(3-0) CSS 210 or concurrently.

Turfgrass management of golf courses, home lawns, parks, and athletic fields. Species identification and adaptation, routine and specialized cultural practices, pest identification and control.

350. Plant and Animal Genetics
(CSS 250.) Winter. 5(5-0) Juniors or approval of department.

Fundamentals of modern genetics with particular focus on problems and application in agriculture and natural resources.

380. Ecology and Physiology of Agricultural Plants
Spring. 3(3-0) BOT 301; CSS 101 or HRT 101.

Interrelationships of physiological processes and environmental manipulation for higher yield of agricultural plants.

390. Soil Conservation and Land Use
Winter. 3(3-0) CSS 210.

Concepts of soil erosion by water and wind and methods for soil conservation including control of erosion and sedimentation. Interpretation of soil properties for land use decisions.

402. Principles of Weed Control in Field Crops
Fall. 4(3-2) CEM 143, BOT 301.

Principles underlying weed control practices for agronomic crops. Factors involved in mechanical, chemical and biological control and basic physiological aspects of herbicide applications.

406. Crop Improvement and Seed Production
Winter. 4(3-2)

Practical methods of crop improvement, seed production, storing, cleaning, packing, and distribution, seed certification of small grains, legumes, corn, beans, potatoes, visits to seed agencies and seed farms.

408. Principles of Plant Breeding
Winter. 4(3-2) CSS 350. Interdepartmental with the Department of Horticulture.

Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

411. Independent Study
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits if different problem is taken. Approval of department.

Individual work on a field, laboratory or library research problem of special interest to the student and supervised by faculty.

412. Topics in Agronomy
Fall, Winter, Spring, Summer. 2(2-0) or 3(3-0) May reenroll for a maximum of 9 credits if different topics are taken. Approval of department.

Topics will be selected from crop production, crop physiology, turfgrass management, organic soils, turfgrass soils, soil fertility and genetic analysis.

414. Turfgrass Soil Management
Fall. 3(2-2) CSS 318.

Fertility and pH control of turf soils; drainage; irrigation programming; cultivation; topdressing; soil amendments; construction of specialized soils.

416. Principles of Turfgrass Culture
Winter. 3(3-0) CSS 318.

Growth and development of the turfgrass plant as related to turfgrass management practices.

417. Turfgrass Seminar
Fall. 1(2-0) CSS 318.

Seminars by leaders of the turfgrass industry; golf course design and maintenance, specialized equipment, and research developments.

419. Management of Turfgrass Pests
Fall. 4(3-2) CSS 318 or concurrently.

Chemical, biological and cultural methods of managing weed, disease, and insect pests of turfgrass.

420. Seminar
Winter. 1(1-0) May reenroll for a maximum of 4 credits.

424. Forest Soils
Spring. 3(2-3) CSS 210; Juniors or approval of department. Forestry majors: FOR 305, FOR 402, FOR 425, FOR 429 concurrently. Interdepartmental with and administered by the Department of Forestry.

Interrelationships of forest site and the growth of trees. Properties, classification, inventory, productivity and management of forest soils. Effects of silvicultural and forest management practices on the soil.

426. Microbial Ecology
Spring. 3(3-0) MPH 301 or MPH 303, MPH majors must enroll concurrently in MPH 426A. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Microbial activities in natural ecosystems; their association with plants and animals, and their transformations of carbon, nitrogen and sulfur in soil and aquatic habitats.

426A. Microbial Ecology Recitation
Spring. 1(1-0) MPH 426 concurrently. Interdepartmental with and administered by the Department of Microbiology and Public Health.

Quantitative aspects of microbial ecology.

430. Soil Fertility and Fertilizers
Spring. 4(3-2) CSS 210.

Diagnosing fertility status of soils by soil analysis and plant deficiency symptoms. Liming and fertilization with macro- and micronutrients and transformation of nutrients in soils. Fertilizer manufacture technology and use.

440. Soil Biophysics
Winter. 3(3-0) CSS 210 and BOT 301; CSS 380 recommended.

Salient features of soil physical and biological properties related to plant growth, principles and applications. Emphasis on root responses to the environment. Bioenergetics of the root-soil interface.